PATENT SPECIFICATION (11) 1 551 492

(21) Application No. 27820/77 (22) Filed 4 July 1977 (19)

1 551 492

(31) Convention Application No. 2 657 665

(32) Filed 20 Dec. 1976 in

(33) Fed. Rep. of Germany (DE)

(44) Complete Specification published 30 Aug. 1979

(51) INT. CL.² B23D 61/12

(52) Index at acceptance

B5L 4 5A 5D 6

(72) Inventors ROTTGER JANSEN-HERFELD and STEFAN ELMER

(54) A SAW FOR CUTTING CARCASES INTO PIECES

(71) We, SCHMID & WESEL, of Hölderlinstrasse 18, D-7133 Maulbronn, Federal Republic of Germany, a German Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a power saw of the kind (herein called "the kind defined") used for cutting carcases into pieces, the saw comprising an elongated longitudinally reciprocating power-driven saw blade in slidable association with an elongated guide blade which is fixed to a housing, one end of the saw blade being connected to a guide rod in the housing whereas near its other end the saw blade is constrained by further guide means provided on the guide blade, the longitudinal back edge of the saw blade and a complementary edge of the guide blade having mutually cooperating guide groove and guide projection formations, and the guide groove formations being provided with gaps which are spaced from each other over the length of the guide groove formation and are open laterally alternately on opposite sides of the guide groove formation.

There have been various proposals for obtaining adequate guidance of blades in reciprocating-blade saws, such saws usually being intended for cutting wood.

According to one such proposal the saw blade consists of three side-by-side strip-type parts interconnected by spot-welding, the middle strip being narrower so that a guide groove is formed between margins of the outer strips. A guide projection, of rectangular cross-section, on a guide blade protrudes into this guide groove. The production of the saw blade is expensive. If such a blade is used in an abattoir blood and body fluids can penetrate into the narrow interstices between the spot-welded parts of the saw blade, so that complete cleaning is practically impossible. Furthermore the entire saw blade guide is also difficult to clean, as for this purpose the saw blade must be removed if the residues between the saw blade and the guide blade are to be cleaned away thoroughly.

The invention is therefore intended to provide a saw of the kind defined with a saw blade and guide means such that the saw blade is guided well even with considerable flexure, and does not incline to seize because of foreign matter during use, whereas production costs can be low and thorough cleaning can be conveniently effected.

According to the invention a power saw of the kind defined is characterised in that the guide groove formation with the gaps which are open laterally alternately on opposite sides of the guide groove formation is formed by means of oblique surfaces which are distributed over the length of the guide groove formation and slope in opposite directions alternately so that as viewed from one end along the guide groove formation the latter is V-shaped, and the guide projection formation is of complementary V-shape to fit into the guide groove formation.

Thereby during use extensive self-cleaning of the saw blade guide can occur, and simple cleaning without dismantlement of the saw blade is possible. Moreover due to the said self-cleaning there is no undue tendency to seize between the saw blade and the guide blade, and the saw blade remains well guided even when subject to flexure together with the guide blade.

Due to the said gaps cleaning liquids have good possibility of access along the entire guide groove formation, and foreign matter can easily be washed out. In operation fat from carcases being cut up can gain easy access to the guide formations, so that the tendency to wear is substantially reduced and adequate lubrication is ensured without additional lubricants.

As the guide groove formation is V-shaped in cross-section, the angle thereof

can be approximately between 30° and 90°, preferably substantially 60°.

Rational manufacture is possible due to the alternately-directed oblique surfaces, all of which have a common inter-section line parallel with the guide direction. For better accessibility the pitch of the oblique surfaces amounts to a multiple of the pitch of the teeth of the saw blade, and is preferably twice as great. In a preferred form the pitch of the oblique surfaces amounts to about 12 mm. and the pitch of the teeth is about 6 mm. In order further to facilitate cleaning and to simplify production, the oblique surfaces can overlap one another in the longitudinal direction, and then the formation can be made with very coarse tolerances without risk of trouble during use. The guide groove formation is expediently formed in the saw blade and a longitudinal edge of the guide blade facing the saw blade is formed as a continuous guide projection formation, but equally well the saw blade may have the projection whilst the guide blade has the groove formation.

For secure saw blade guidance, even when the saw blade and guide blade are greatly curved, the saw blade may be provided near one end with a longitudinal slot, and the said further guide means may include a nose protruding into the longitudinal slot so that the guide projection formation cannot jump out of the guide groove formation.

For driving the saw blade reciprocatingly there may be a drive means including a rotary drive shaft, of which one end carries an oblique bearing journal, the axes of the drive shaft and of the bearing journal extending for example at an angle of about 15° to one another and intersecting one another at a point, whilst on the oblique bearing journal is mounted a ring having a protruding peg which extends into an aperture in the guide rod connected to the saw blade. Thus a sinusoidal saw blade movement is rendered possible, with small moving mass, whereby a smooth, wear-free running of the saw is achievable. The axes of the peg and the oblique bearing journal may be perpendicular to one another, and these axes and the axis of the drive shaft may intersect at one point. Long wear-free operation can be achieved if in the guide rod and transversely thereof there is a bearing bore locating a bearing pin through which the peg of the ring extends; with this construction assembly becomes simple and no special securing devices are necessary. To reduce the moving masses, the guide rod can be at least partially hollow.

How the invention may be put into practice is explained in greater detail hereinafter with reference to the accompanying drawings, wherein:—

Figure 1 shows a lateral elevation of a compass saw embodying the invention, partially in section,

Figure 2 shows a section along the line II—II in Figure 1,

Figure 3 shows a section along the line III—III in Figure 1,

Figure 4 shows a lateral elevation of a saw blade,

Figure 5 shows a plan view of the back of the saw blade,

Figure 6 shows a further lateral elevation of the saw blade, from the side opposite to that of Figure 4,

Figure 7 shows a section through the saw blade along the line VII—VII of Figure 4,

Figure 8 shows a section through the saw blade along a line VIII—VIII of Figure 4,

Figure 9 shows a section through the saw along the line IX—IX of Figure 1, and

Figure 10 shows a section along the line X—X of Figure 1.

The saw as illustrated in Figures 1, 9 and 10 can be suspended on a ring 1 and can be manually guided by means of this ring and a handle 2. A saw blade 8 can be moved to-and-fro by means of a motor (not shown) preferably an electric or pneumatic motor, a gearing 3, drive means 4, and a guide rod 5 which is guided in guide bushes 6 in the housing 7.

The saw blade 8 over its whole length has a back edge 9 with formations to engage a longitudinal edge 10 of an elongated guide blade 11. The saw blade is further guided in an end region by two lateral guide plates 12, 13 and in at least one intermediate region by two further lateral guide plates 14 and 15 (Figure 3). The guide plate 12 also has a nose 16 (Figure 2) which engages in a longitudinal slot 17 of the saw blade 8.

In order to achieve secure guidance over the whole length of the saw blade even in the case of major flexure of the saw blade 8 and of the guide blade 11, the back 9 of the saw blade is provided with a guide groove 18 (Figures 2 and 3) into which there extends a guide projection 19 of the guide blade 11. The projection 19 extends over the whole longitudinal edge 10 of the guide blade 11.

The formation of the saw blade 8 may be seen from Figures 2 to 8. For the formation of the guide groove 18, oblique surfaces 20 and 21 sloping alternately in opposite directions to one another are provided. The angle 22 between these surfaces 20, 21 preferably amounts to about 60°. The surfaces 20, 21 sloping thus and overlapping in the longitudinal direction produce laterally open gaps 23 in the saw blade 8. In the regions of these gaps 23 the guide projection 19 of the guide blade 11 is freely accessible. The length of each of the surfaces 20 and 21 is made greater than the actual pitch 24 (Figures 5 and 6) of the surfaces

20 and 21, so that the surfaces 20 and 21 overlap longitudinally, and hence large production tolerances can be permitted. The pitch 24 of the faces 20, 21 is twice as great as the pitch of the teeth (Figures 4 and 6).

The guide plates 12 and 13 are screwed to one another, as are the guide plates 14 and 15, clamping the guide blade 11 between them. The saw blade 8 is guided displaceably with only slight lateral clearance.

The drive means 4 for the saw blade 8 includes an oblique bearing journal 28 carried by a drive shaft 27 at a relative angle 26. On the oblique journal 28 is mounted a ring 30, with the aid of two ball bearings 29.

This ring 30 has a peg 31 which extends through a bearing pin 32. This bearing pin 32 (Figure 10) is guided in two bearing bores 33 of the guide rod 5. To allow pivoting movements of the peg 31, the guide rod 5 is thickened and provided with an aperture 34 (Figure 1) in this region.

The axis 36 of the peg 31 is perpendicular to the axis 35 of the bearing journal 28. The axes 35, 36 and 37 all intersect at a common point 38, whereby well-balanced running of the drive means 4 is achieved.

WHAT WE CLAIM IS:—

1. A power saw of the kind defined herein, characterised in that the guide groove formation (18) with the gaps (23) which are open laterally alternately on opposite sides of the guide groove formation (18) is formed by means of oblique surfaces (20, 21) which are distributed over the length of the guide groove formation (18) and slope in opposite directions alternately so that as viewed from one end along the guide groove formation the latter is V-shaped, and the guide projection formation (19) is of complementary V-shape to fit into the guide groove formation.

2. A saw according to Claim 1, wherein the angle (22) of the V-shape is substantially 60°.

3. A saw according to Claim 1 or 2, wherein the pitch (24) of the oblique surfaces (20, 21) is a multiple of the pitch (25) of the teeth of the saw blade (8).

4. A saw according to Claim 3, wherein the pitch (24) of the oblique surfaces (20, 21) is twice as great as the pitch (25) of the teeth of the saw blade (8).

5. A saw according to Claim 4, wherein the pitch (24) of the oblique surfaces (20, 21) amounts substantially to 12 mm. and the pitch (25) of the teeth of the saw blade (8) amounts substantially to 6 mm.

6. A saw according to any one of the preceding Claims, wherein the oblique surfaces (20, 21) overlap one another in the longitudinal direction.

7. A saw according to Claim 6, wherein the overlap amounts substantially to 3 mm.

8. A saw according to any one of the preceding Claims, wherein the guide groove formation (18) is provided in the back of the saw blade (8), and a longitudinal edge (10) of the saw blade guide (11) facing the saw blade (8) forms the guide projection formation (19), the latter being continuous.

9. A saw according to any one of the preceding Claims, wherein lateral guide plates (12 to 15) are provided on both sides of the guide blade (11) to engage both sides of the saw blade (8), two (12, 13) of these lateral guide plates constitute the said further guide means, and on one (12) of these two lateral guide plates there is a nose (16) which projects into a longitudinal slot (17) in the saw blade (8).

10. A saw according to any one of the preceding Claims, wherein for reciprocating the saw blade (8) there is a drive means (4) including a rotary drive shaft (27) of which one end carries an oblique bearing journal (28), the respective axes (37, 35) of the drive shaft (27) and of the bearing journal (28) extending at the angle (26) to one another and intersecting at a point (38), a ring (30) is mounted on the oblique bearing journal (28), and this ring (30) comprises a protruding peg (31) which extends into an aperture (34) in the guide rod (5) connected to the saw blade (8).

11. A saw according to Claim 10, wherein the axis (36) of the peg (31) and the axis (35) of the oblique bearing journal (28) are substantially perpendicular to one another.

12. A saw according to Claim 10 or 11, wherein the axes (37, 35, 36) of the drive shaft (27), the bearing journal (28) and the peg (31) all intersect at one common point (38).

13. A saw according to Claim 10, 11, or 12, wherein the ring (30) is mounted on the oblique bearing journal (28) by means of at least one ball bearing or other antifriction bearing (29).

14. A saw according to Claim 10, 11, 12, or 13, wherein the aperture (34) in the guide rod (5) for the peg (31) of the ring (30) has transversely thereof two bearing bores (33) locating a bearing pin (32), and the peg (31) of the ring (30) extends through the bearing pin (32).

15. A saw according to any one of the preceding Claims, wherein the guide rod (5) is at least partially hollow.

16. A saw according to any one of the preceding Claims, wherein the guide rod (5) is guided at its two ends in guide bushes (6) inserted into the saw housing (7).

17. A saw constructed and arranged substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

HANS & DANIELSSON,
Chartered Patent Agents,
32, Lodge Lane,
London, N.12 8JJ.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1979.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

1551492 COMPLETE SPECIFICATION
6 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

Fig. 1

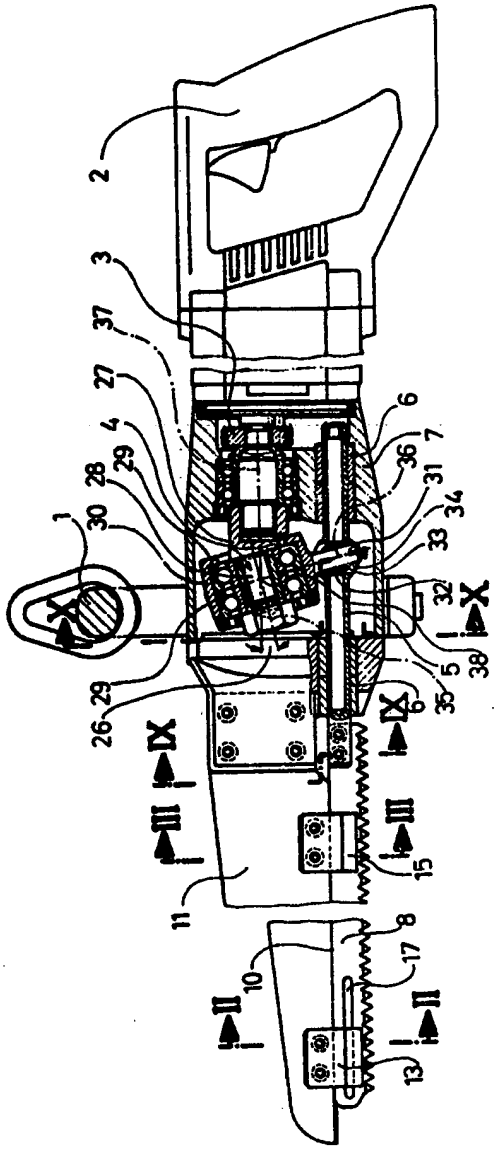


Fig. 2

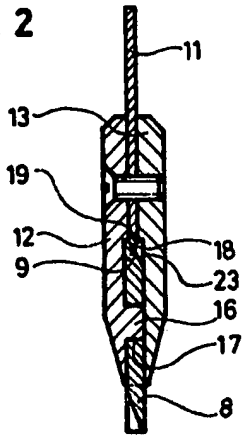
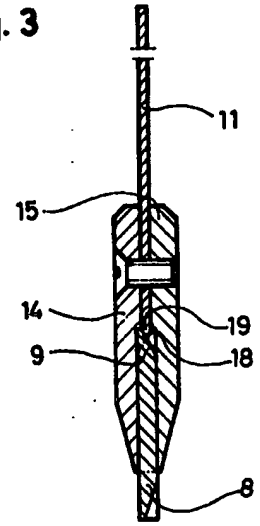


Fig. 3



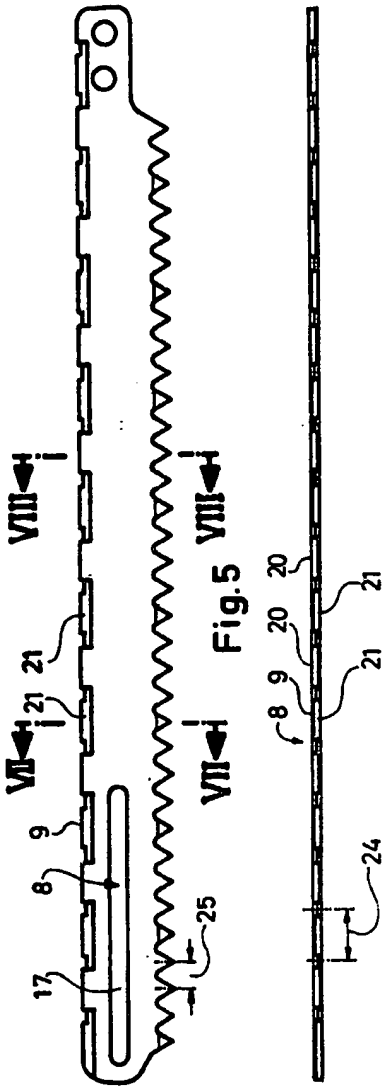


Fig. 4

Fig. 5

1551492 COMPLETE SPECIFICATION
6 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 4

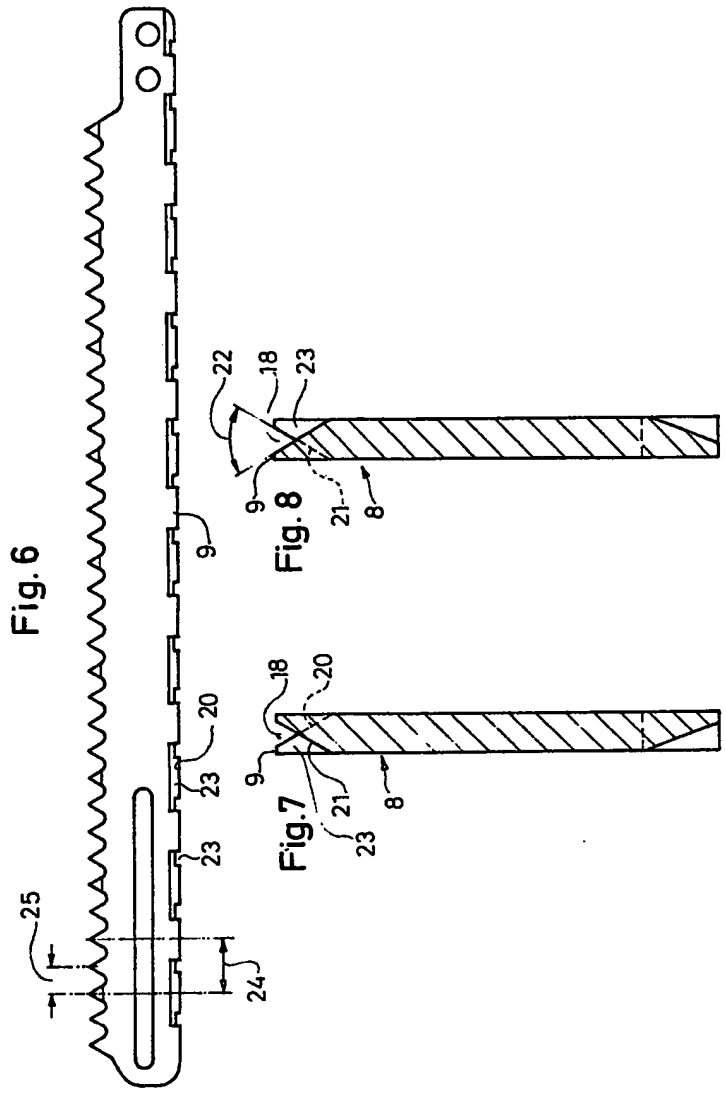
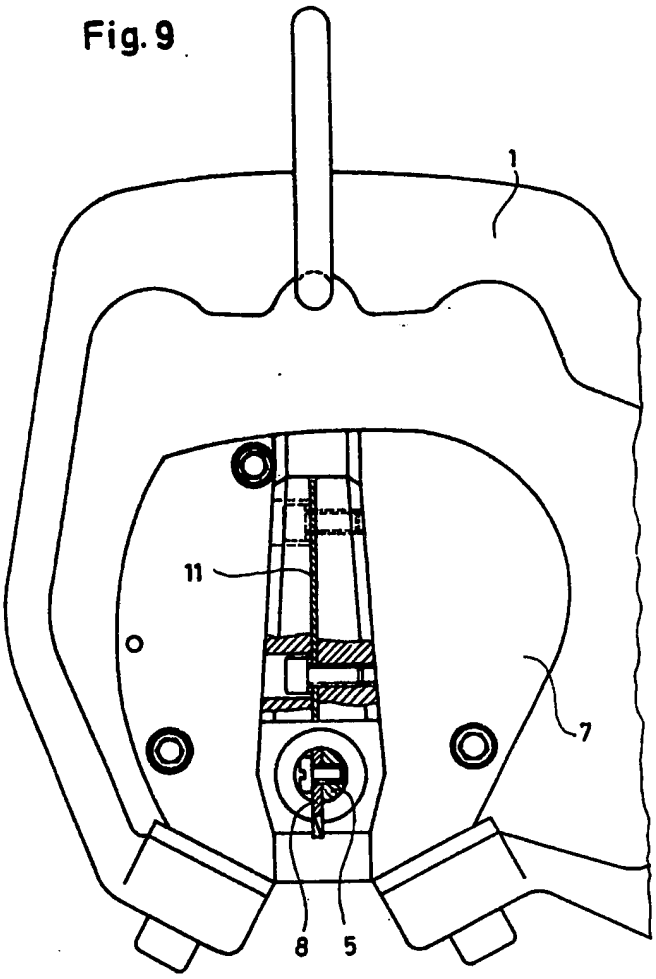


Fig. 9



1551492 COMPLETE SPECIFICATION
6 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 6

Fig. 10